

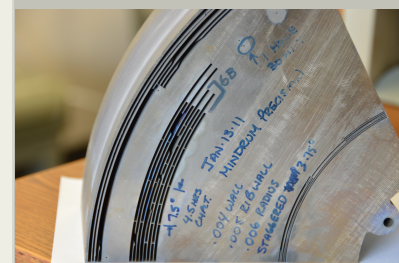
Precollimator Manufacturing for X-ray Telescopes, Phase I

Completed Technology Project (2015 - 2015)



Project Introduction

Space-based x-ray telescopes currently involve the use of a precollimator (PC) to shield the optics from stray light. Each PC consists of cylindrical aluminum ribs (blades) with varying radii, alignment frames to guide the blade positions and the blade housing body. The alignment frame and the housing are made of Aluminum 6061 and 7075 alloy, respectively. A heat-forming process with thin aluminum sheets is used to produce the ribs that run between the alignment frame. We are proposing a new method to build a PC out with emerging technologies, using Additive Manufacturing (AM) to build a blank that is the rough shape of the PC but with thickened ribs and then using wire Electric Discharge Machining (EDM) to cut the final shape. This will result in an easier to produce PC, with more rigidity due to its integral structure and potentially thinner and better positioned blades. It will also be made of Titanium instead of Aluminum and have a less shiny surface finish, both of which are more favorable characteristics in stray light blocking. We plan to design a Test Article that mimics the size and location configuration of the current PC technology. We plan to investigate the competing AM processes of Direct Metal Laser Sintering (DMLS) and Electron Beam Welding (EBM) to determine which one is a better process for the blank fabrication and if there are any potential limitations to either technology. Then we will use a cutting-edge technology wire EDM machine to cut the final shape in the blank and determine what limitations exist in positioning accuracy and thickness of the blades. We anticipate both to be better than the current PC technology.

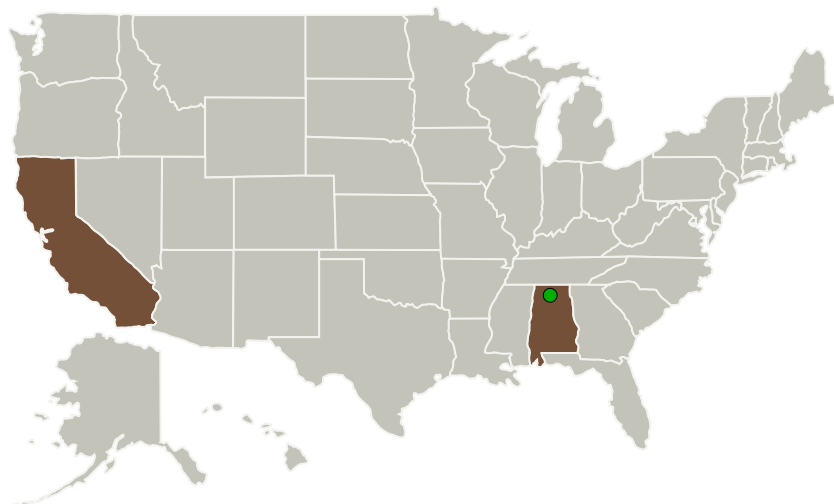


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Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Mindrum Precision, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Rancho Cucamonga, California
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations

Alabama	California
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Project Transitions

**June 2015:** Project Start**December 2015:** Closed out**Closeout Summary:** Precollimator Manufacturing for X-ray Telescopes, Phase I Project Image**Closeout Documentation:**

- Final Summary Chart Image(<https://techport.nasa.gov/file/139348>)

Images

**Briefing Chart Image**

Precollimator Manufacturing for X-ray Telescopes, Phase I
(<https://techport.nasa.gov/image/129238>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Mindrum Precision, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

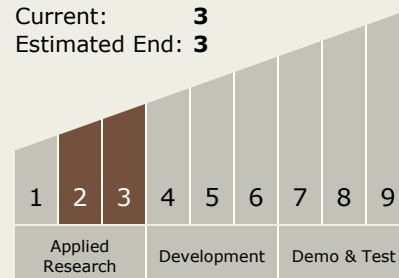
Carlos Torrez

Principal Investigator:

Anthony J Pinder

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.3 Optical Components

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System